

**Center's Internet Web Page URL Address:
<http://tsc.wes.army.mil>**

March 1998 TSFMS Task Group Meeting

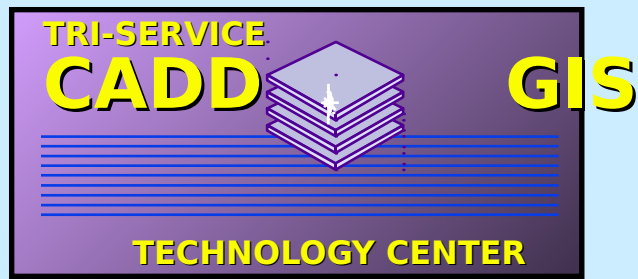
TRI-SERVICE

CADD



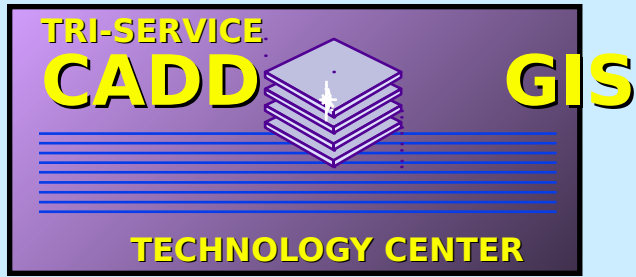
GIS

TECHNOLOGY CENTER



TSSDS Technical Implementation Guides

- **Scope** - Develop technical guidance and instructions for implementing the TSSDS on the predominant commercially available GIS platforms used by the Department of Defense (DoD).
- ***Fiscal Year 1997 Effort - TSSDS Technical Implementation Guides Developed for -***
 - ESRI ARC/INFO - ARC/INFO 7.0, UNIX, Oracle database.
 - Intergraph MGE/MGA - Windows NT, Oracle and Informix databases.
 - ESRI ArcView - ArcView 3.0, Windows NT, Oracle and Access databases.
- ***Where to Get Them - Tri-Service CADD/GIS Technology Center Web Site -***
 - Go to Tri-Service Center's Internet Web Site (<http://tsc.wes.army.mil>)
 - Select "Products" button.
 - Select "Spatial Data Standards".



Tri-Service CADD and GIS Standards Development Projects

CADD/GIS Data Standards for the Project/Installation Life Cycle

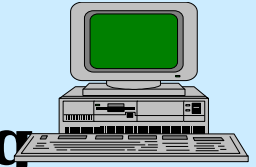
- Current Tri-Service CADD/GIS Standards Initiatives
 - Part 1: A-E Deliverables Standards
 - Part 1.1: A-E CADD Deliverables Standards
 - Part 1.2: A-E GIS Deliverables Standards
 - **Part 2: A/E/C CADD Data Standards**
 - **Part 3: Spatial Data Standards (TSSDS)**
 - **Part 4: Facility Management Standards (TSFMS)**

Related FY98 Projects

- Integration of CADD and GIS Data Standards

PROJECT LIFE-CYCLE DATA MODEL

Planning



Master Plans
Base Closure Plans
NEPA Reports
RPMA
Natural/Cultural Resources

Spatial Data Standards

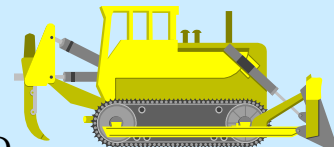
Design

Plans &
Specificati

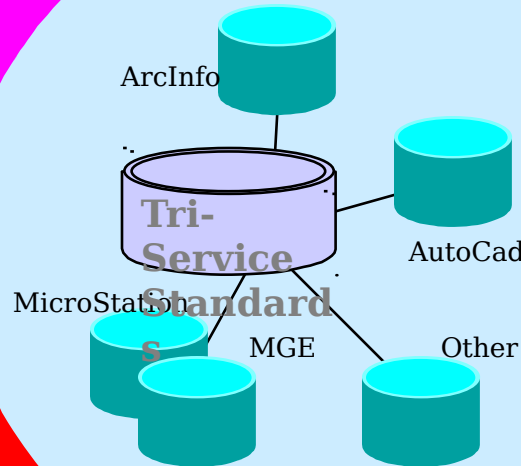
A/E/C CADD Stds.

Constructi

As-Built CADD
Drawings
Shop Dwgs



As-Is CADD
Drawings



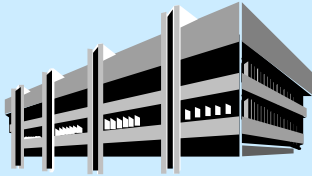
Maintenance

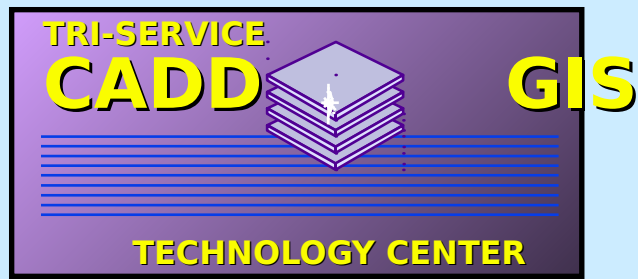
AIS
Work Orders
Environmental Restoration

Facility Management Stds.

Operations (Base/Mil)

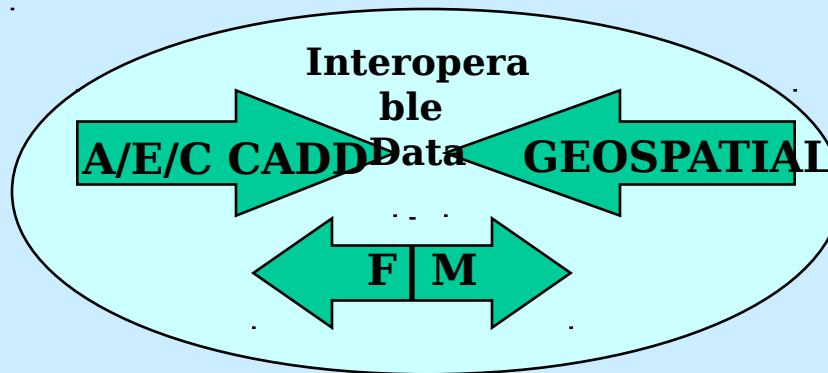
ISR
Mobilization Plans
Environmental Compliance
Emergency Response
Range Management





Tri-Service A/E/C CADD Standards (A/E/C CADD Standards)

Applies to the Use of CADD for Design and Construction Architectural Design Engineering Design Construction



Tri-Service Spatial Data Standards

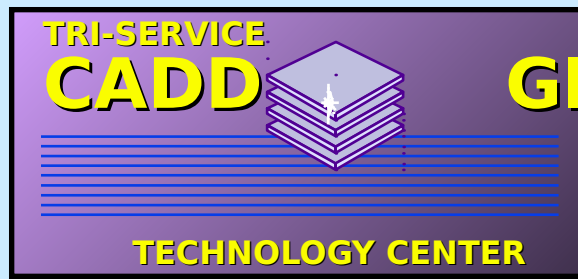
(TSSDS) Use of GIS and Geospatial Data Systems (GDS) to depict the geographic location and characteristics of natural or constructed features and boundaries on the Earth. GIS Cultural & Natural Resource Planning Mapping

Tri-Service Facility Management Standards (TSFMS)

Applies to the Use of CADD (with attached Database) and/or GIS/GDS for Project & Installation Life-Cycle Management. Provide Integration and Interoperability between the TSSDS, A/E/C CADD Standards, and Information Management Systems.

Utilities Management
Building Management
Space Management
Grounds & Range

Environmental Restoration/Compliance
Real Estate & Leased Areas Management
Improvements Management (e.g., roads, sidewalks).



Tri-Service CADD & GIS Standards - Current Status - Fiscal Year 1997

Tri-Service A/E/C CADD Standards

Design Life Cycle Phase:

- Architectural & Engineering Design CADD Drawings

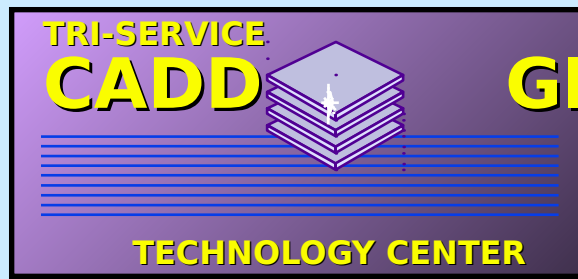
Tri-Service Spatial Data Standards

Planning Life Cycle Phase:

- Master Plan
- Base Comprehensive Plan
- Planning Phase GIS
- Env. Restoration Confirmation Study GIS

Design Life Cycle Phase:

- Environmental Restoration Site Management & Design Analysis GIS



Tri-Service Standards - Future

Tri-Service Life Cycle CADD/GIS Integration

A/E/C CADD Standards

Planning Life Cycle Phase:

- CADD drawing to be incorporated into future design/construction project.

Design Life Cycle Phase:

- Architectural & Engineering Design CADD Drawings/Database

Construction Life Cycle Phase:

- “As-Built” CADD Drawings/Database

Operations/Facility Management Life Cycle Phase:

- “As-Is” CADD Drawings/Database

Spatial Data & Facility Management Standards

Planning Life Cycle Phase:

- Planning Phase GIS
- Master Plan/Base Comprehensive Plan
- Environmental Planning GIS
- Small Scale Map/GIS

Design Life Cycle Phase:

- Design Phase GIS (Environmental Restoration Site Management & Design Analysis GIS)

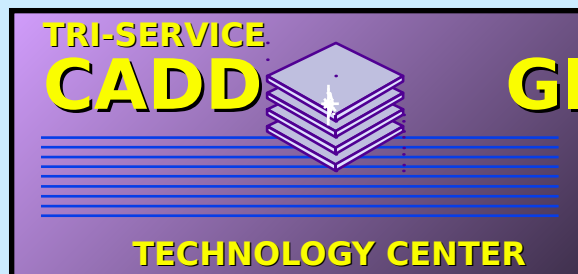
Operations/Facility Management Life Cycle Phase:

- Facility Management GIS
 - Space Management
 - Utilities Management
 - Environmental Restoration/Compliance
 - Real Estate/Parcel Management
 - Building Management
 - Improvements/Range/Grounds Management

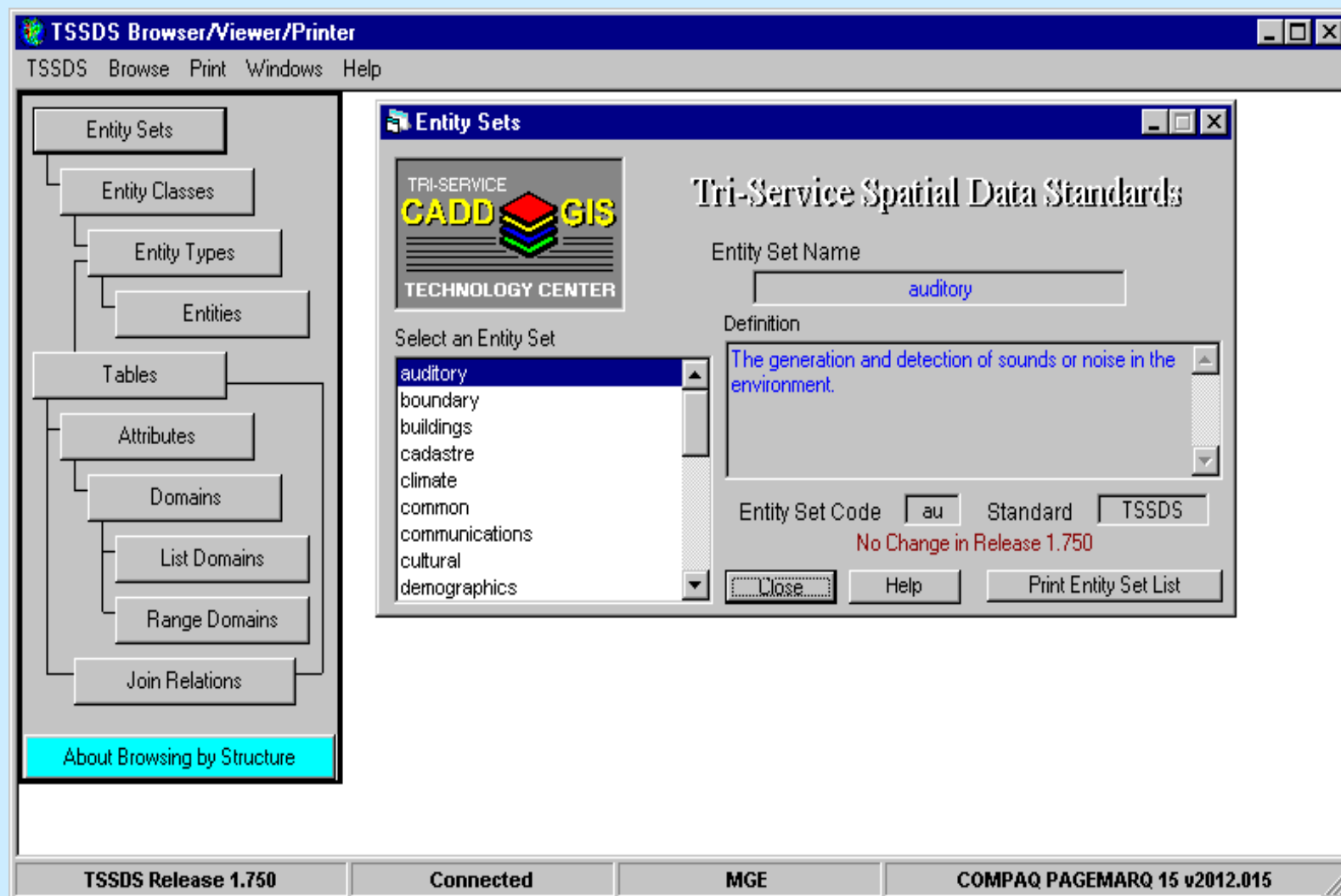


Tri-Service Spatial Data Standards (TSSDS)

- TSSDS, Release 1.75 -
 - Completed in January 1998.
 - Downloadable digital version placed on Tri-Service Center's Internet Web Site on February 3, 1998.
 - Interactive TSSDS Windows Application upgraded, introduced the new 32 bit browser application.
 - Data Models for each Entity Class were included on
CD-ROM.



GIS TSSDS Release 1.75 - 32 Bit Browser



Tri-Service Spatial Data Standards (TSSDS)/Tri-Service Facility Management Standards (TSFMS) - Future

- **TSSDS/TSFMS, Release 1.8 -**
 - Currently scheduled to be published on CD-ROM in July 1998.
 - Downloadable digital version to be placed on Tri-Service Center's Internet Web Site.
 - Continued improvement of Interactive TSSDS Windows Application, focusing on "User-Friendly" changes.
 - Expanded capability to do queries by "Alias" name and "Keyword" search.
 - Introduce the capability to filter and print TSSDS/TSFMS components by activity (e.g., base comprehensive planning/master planning, environmental restoration, etc.).
 - Develop "Common" (Long) Names for Attribute Tables and Attributes.
 - Develop "Toolbox" Software to assist Users in upgrading existing GIS databases to latest release of TSSDS/TSFMS.

Tri-Service Spatial Data Standards (TSSDS)/Tri-Service Facility Management Standards (TSFMS) - Future

- **TSSDS/TSFMS, Release 1.8 -**
 - **Expand Data Content and improve Interoperability with A/E/C CADD Standards and Facility Management Information Management Systems.**
 - Address Environmental Compliance and additional Environmental Restoration data requirements.
 - Begin Expansion of Cultural, Flora, Fauna, Communications, and Transportation Entity Sets.
 - Incorporate Range and Training features and data requirements.
 - Through FGDC Geospatial Standards Initiative - Work with EPA and other agencies in improving and expanding the Utilities and Environmental Protection Entity Sets.
 - Resolve and incorporate various TSSDS User comments and suggestions.
 - Incorporate USACE Mississippi Valley Division Regional Engineering and Environmental GIS (REEGIS) Features and Data Standards.
 - Incorporate FGDC Soils, Vegetation, and Wetlands Standards.

Tri-Service Spatial Data Standards (TSSDS)/Tri-Service Facility Management Standards (TSFMS) - Future

- Future -
 - Improve Interactive TSSDS Windows Based Application. Focus on 32 bit Windows 95/NT Based Technology.
 - Coordinate with other Federal and International Organizations developing GIS and Geospatial Standards.
 - Incorporate CADD/GIS Facility Management Data Standards.
 - Integrate TSSDS & A/E/C CADD Standards.
 - Facilitate Sharing of Data and Integration with Corporate Information Systems.
 - Incorporate User Comments and Requests for additions to the standards.
 - Expand use of Internet and Web Technology.
 - Expand and Improve Symbol Sets.
 - Develop Workspaces.
 - Develop Electronic Data Entry and Data Editing Procedures & Tools.

Tri-Service Spatial Data Standards (TSSDS) - Design Considerations

TSSDS/TSFMS Design Considerations

- **Must be nonproprietary and be compatible with the predominant Commercially Available CADD and GIS Software used by the Tri-Services.**
- **GIS and CADD Software include:**
 - ARC/INFO - MicroStation - ArcView - Autodesk Map/World
 - MGE - AutoCAD - MicroStation GeoGraphics
- **Relational Database Software includes:**
 - ANSI Standard Structured Query Language (SQL)
 - Informix SQL - ODBC Relational Databases (e.g., Access)
 - Oracle SQL
- **Operating Systems include:**
 - UNIX
 - DOS / Mac (Declining in use)
 - Windows 3.1, 95, and NT (primary emphasis will be on 95/NT in future)

Tri-Service Spatial Data Standards Design Considerations

- Quality Assurance
 - Standard Naming Conventions
 - All Coverage and Map File, Attribute Table, and Entity Names Based on Entity Set and Entity Class
 - ‘8.3’ File Name Format for Tables, Maps, and Coverages
 - Optimizes Delivery on Multiple Platforms
 - File Naming Supports Tiling and Temporal Archiving
 - Uppercase Domain Values Improve Query Quality and Consistency
 - Normalized Naming Supports Batch Processing in Multiple OS Environments

Tri-Service Spatial Data Standards Application

- Interactive Spatial Data Standards Application
 - Self-contained Microsoft Access “Run-Time” Application (16 Bit Version)
 - Self-contained Microsoft Visual Basic Application (32 Bit Version)
 - Runs on Windows 3.1, 95, or NT Personal Computer
 - No Additional Software Required
 - Distributed on CD-ROM and the Internet
 - A “Living Application”; Versioning
 - Release 1.75 available today
 - Most current Version available for download from Tri-Service CADD/GIS Technology Center Internet Web Site.

Tri-Service Spatial Data Standards (TSSDS) - Data Model

TSSDS DATA MODEL ORGANIZATION

- ENTITY SETS
- ENTITY CLASSES
- ENTITIES (ENTITY TYPES)
- ATTRIBUTE TABLES
- DOMAIN TABLES

TSSDS Data Model

Organization

- Entity Sets - Broad grouping for data management purposes.
- Entity Classes - Grouping of data within each Entity Set for Data Management Purposes.
- Entity Types - Grouping of Items that appear graphically on a map or drawing. Grouped within each Entity Class.
- Entities - Items that appear graphically on a map or drawing. Grouped within each Entity Type. Each Entity Type may have one or more Entities.
- Attribute Tables - A relational database table containing non-graphic information, or attribute data. Grouped within each Entity Class.
- Domain Tables - Contains lists of “valid” or “permissible” values for specific attributes in an Attribute Table.

TSSDS Current Entity Set Organization

- Entity Sets (Currently 24 Themes in TSSDS Release 1.7)

Auditory

Flora

Transportation

Boundary

Geodesy Utilities

Buildings

Geology Visual

Cadaastre

Hydrography

Climate

Improvements

Common

Landform

Communications

Land Status

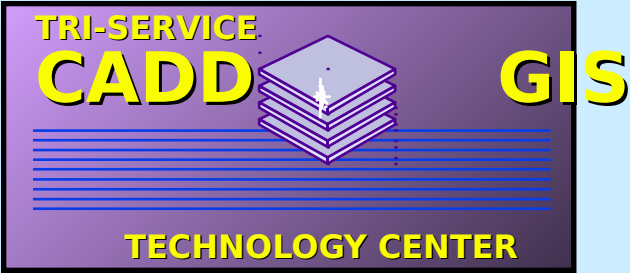
Cultural

Military Operations

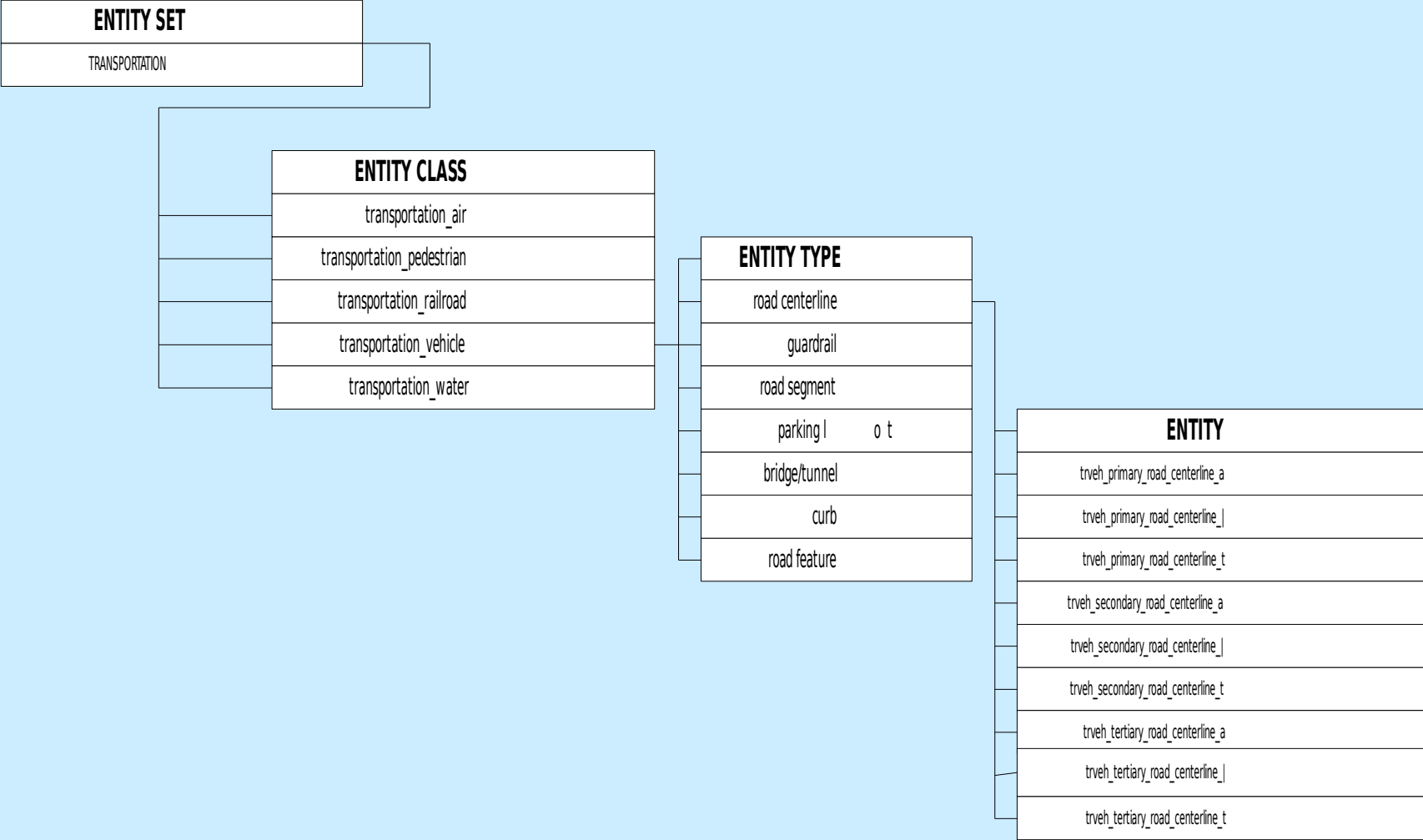
Demographics

Olfactory

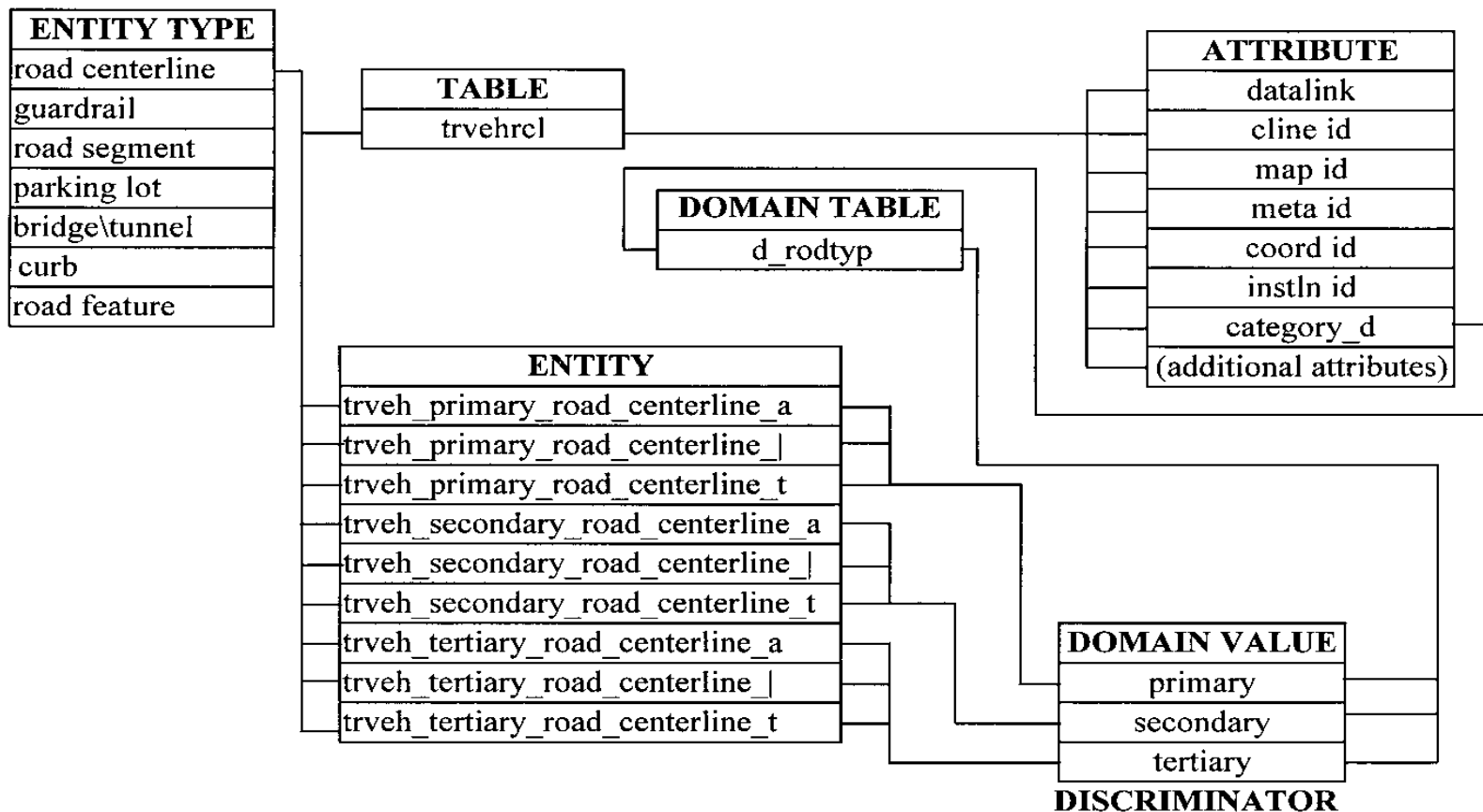
Environmental Hazards (Environmental Protection in Release 1.8)



Example TSSDS Structure



Example TSSDS Structure



Tri-Service Spatial Data Standards Data Model

Entity Type
water_line

Attribute
mat_d

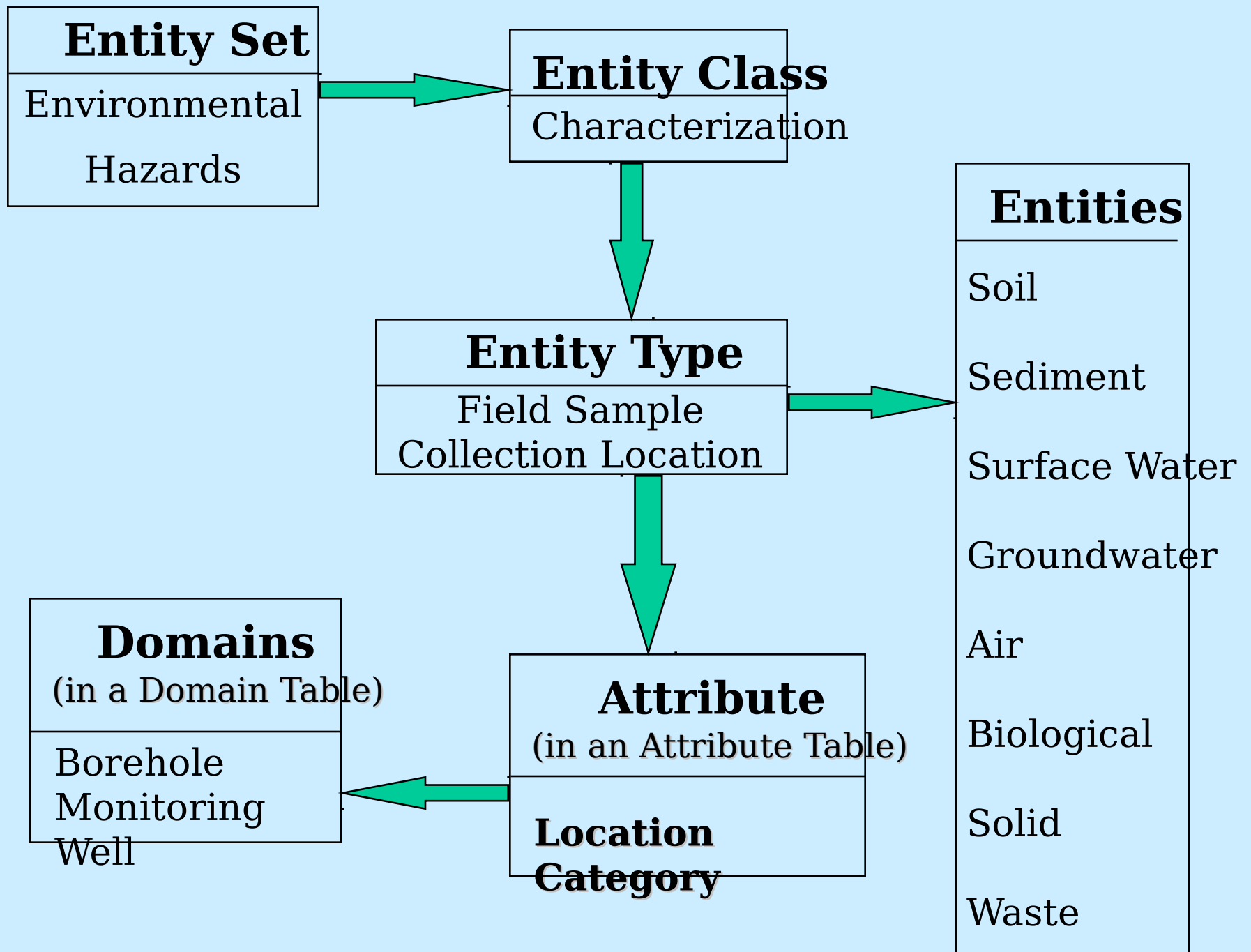
Domain Value
PVC

water_line	
datalink:	100004
pipe_id:	utwatpip000000536
map_id:	234
meta_id:	utwatpip000000
media_id:	utwatpip000000
coord_id:	97894
date_acqrd:	19730818
dispostn_d:	PERMANENT
use_d:	MAIN
type_d:	CIRCULAR
mat_d:	PVC
size_d:	PVC
pipe_mtr:	REINFORCONCR
dim_u_d:	REINFPLASMOR
inv_elv_1:	SINGLE_CLAY
grnd_elv_1:	SINGLE_TILE
inv_elv_2:	254
grnd_elv_2:	257
elv_u_d:	FT

Record: 1 of 1

Spatial Data Standards Data Model

<i>Entity Set</i>	<i>Entity Class</i>	<i>Entity Type</i>	<i>Attribute</i>	<i>Domain</i>
Utilities \implies	Water System	SDTS (FIPS 173) Data Model		
	Natural Gas			
Wastewater \implies	Drain Sump			
	Grease Trap			
	Septic Tank \implies	Capacity		
		Age		
		Composition \implies	Concrete	
			Fiberglass	
			Steel	



FY97 TSFMS Effort

- One TSFMS Task Group Meeting.
- CAFM Survey. Report to be completed in FY98. (LANTDIV doing work with Tri-Service funds).

FY97 TSFMS Effort

- Initiated TSFMS development efforts.
 - Environmental Compliance Data Standards (from EPA, DESCIM, Comments, Baker Environmental, Fort Richardson (Alaska), PAX, etc.).
 - Expanded Environmental Restoration Data Standards (from AFCEE, DESCIM, FGDC Facilities Working Group, etc.). Funded by FCAD2 Program.
 - Expanded Communications Data Standards. Funded by DLA.
 - Interviews at 3 Installations.
 - Review of Intergraph FM Software Database Schema.
 - Initial investigation of Space Management Data Standards.

FY98 TSFMS Development Plan

- Component 1 - TSFMS Task Group Meeting(s)
- Component 2 - Complete CAFM Initiatives Survey
- Component 3 - TSFMS Reporting, Coordination, and Customer Service
- Component 4 - Develop TSFMS Technical Content
- Component 5 - Develop and Update IDEF Models
- Component 6 - Develop and Distribute Integrated TSSDS/TSFMS Release
- Component 7 - Center Overhead & Administration

FY98 TSFMS Development Plan

- **Component 1 - TSFMS Task Group Meeting(s)**
 - Conduct TSFMS Task Group Meeting & Update TSFMS Development Plan.
- **Component 2 - Complete CAFM Initiatives Survey**
 - Being Accomplished by LANTDIV. CAFM Survey was completed in FY97. CAFM Report, Database, and CAFM Software Research to be completed in FY98.
- **Component 3 - TSFMS Reporting, Coordination, and Customer Service**
 - Project Coordination; Update and Maintain TSFMS Web Site; Update TSFMS Project Info on Web Site; Prepare Written Articles, Guidance, & Presentations Concerning TSFMS, Continued Coordination with DoD/Federal CAFM Initiatives.

FY98 TSFMS Development Plan

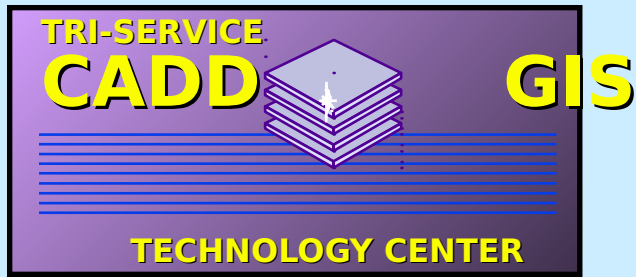
- **Component 4 - Develop TSFMS Technical Content**
 - Begin Research & Develop Space Management CADD/GIS FM Data Standards
- **Component 5 - Develop and Update IDEF Models**
 - Develop IDEF Models for TSSDS/TSFMS Release 1.8.
 - Develop IDEF Models to support ongoing TSSDS/TSFMS Development Efforts.
 - Perform Data Standards Modeling to support incorporation of TSSDS/TSFMS with Other DoD & Federal Data Standardization Initiatives.

FY98 TSFMS Development Plan

- **Component 6 - Develop and Distribute Integrated TSSDS/TSFMS Release**

- Update TSSDS Database for Release 1.75
- Review & Test TSSDS Release 1.75 (Using TSSDS Release 1.7 Application.
- Develop & Produce TSSDS Release 1.75 CDs
- Install TSSDS Release 1.75 on Internet Web Site.
- Distribute TSSDS Release 1.75.
- Update TSSDS/TSFMS Database & Application for Release 1.8.
- Review & Test Alpha TSSDS/TSFMS Release 1.8.
- Review & Test Beta TSSDS/TSFMS Release 1.8.
- Review & Test Final TSSDS/TSFMS Release 1.8.
- Produce TSSDS/TSFMS Release 1.8 CD
- Install TSSDS Release 1.8 on Internet Web Site
- Distribute TSSDS Release 1.8 CDs.
- Begin Update TSSDS/TSFMS Database & Application for FY99 Release.

- **Component 7 - Center Overhead & Administration**



Questions ?

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